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Deciding upon a career within the medical field

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CHAPTER 6

Summary, General Conclusions and
Discussion

Introduction and General Problem Statement

The admission procedure for medical programs is a challenging topic. One of the reasons is that the decision to become a physician includes making a choice which is twofold, namely the educational choice of studying medicine and the vocational choice of selecting a particular specialty later on during the curriculum (Elam, 1984). This second decision includes choosing a work environment, either within a clinical setting or within a non-clinical area of the professional expertise. On the other hand, the challenge for universities is to accept those applicants who have the best chances of successfully completing the medical studies and who will also enter the advanced training programs after graduation.

To achieve these goals, first, the applicants should have the necessary cognitive abilities to be able to pass the university examinations successfully. This aspect has been covered through the consideration of the students' grade point average scores (GPA) and/or their scores on the selective performance tests implemented in the medical study's admission process. However, relatively high dropping out rates have remained a trend, even at universities that have implemented cognitive selection criteria in their admission procedures. These high dropping out rates have undesirable consequences for both the individuals involved (e.g., painful experience, decreased future perspectives) and society (e.g., loss of public money, reduction of the care workers supply).

Second, after successfully finishing their studies, students should indeed be willing to start working as physicians or in a related work environment. Previous studies indicated that most often performance difficulties and having made the wrong study decision have been the reasons for students' early drop-out of the medical program (Lievens, Ones, & Dilchert, 2009; Maher et al., 2013). Other drop-out reasons mentioned in the research literature were among others things personal problems, a lack of motivation and inefficient study methods (Lievens et al., 2009; Maher et al., 2013; Urlings-Strop, Stijnen, Themmen, & Splinter, 2009). Therefore, lately the implementation of non-cognitive factors (e.g., personality traits, motivational aspects) into the admission process has increasingly been recommended (Monroe, Quinn, Samuelson, Dunleavy, & Dowd, 2013; Searle & McHarg, 2013). This approach would enable applicants to evaluate their work aspirations much more thoroughly and make a more solid and informed study decision on the basis thereof

(Benbassat & Bauml, 2007; Lievens et al., 2009; Powis, 1994). In addition, medical schools may consider offering formal programs to further assist the medical students in their specialty choice (Iserson, 2003).

The overall goal of this thesis was to explore the relevance of non-cognitive factors within the medical program based on data from Switzerland and Austria. With regard to the medical applicants, we aimed to find out, if subgroups of applicants could be identified therein based on applicants' scores on vocational interests, interest in prestigious professions (referred to as prestige) and personal characteristics. Additionally, in this thesis we also investigated the accurateness of applicants' study expectations by comparing them with the actual study experiences of medical students. The other two studies of this thesis were based on samples of medical students. In one study, we investigated the impact of students' personality characteristics and self-efficacy on their academic achievement on top of their prior performance at high school. The other study aimed to investigate the relative impact of students' vocational interests and level of prestige on their aspired work environments.

As non-cognitive factors, we focused on personal characteristics, vocational interests and study expectations. The personal characteristics were selected based on literature reviews of determinants considered relevant for study success (Robbins, Lauver, Le, Davis, Langley, & Carlstrom, 2004; Trapmann, Hell, Hirn, & Schuler, 2007). These reviews resulted in the selection of self-discipline, emotional stability, social activity and self-efficacy for investigating our research goals. In exploring students' aspired work environments, our selection of vocational interest scales was based on the well-documented model of Holland (1997). Holland (1996, 1997) introduced the following six (personality) types to describe people as well as environments: social interests (e.g., helping others), investigative interests (e.g., exploring and understanding scientific phenomena), artistic interests (e.g., developing new ideas), realistic interests (e.g., manipulating machines), conventional interests (e.g., ordering information), and enterprising interests (e.g., leading a company). We added students' interest in prestigious professions as additional scale to Holland's interest scales, because prestige is generally considered to be of major importance within the medical field (Creed, Searle, & Rogers, 2010; Duffy, Borges, & Hartung, 2009; Rosoff & Leone, 1991). The items to investigate study expectations were based on a survey among students, lectures and physicians to examine the most common

misconceptions about the medical curriculum. Their answers were summarized into the topics practical focus, workload, learning strategies and study demands.

Academic achievement (lower, middle and upper group), aspired work environments (family doctor, specialist in a private practice, specialist in a hospital, scientific researcher, dentist and an option 'not yet decided') and study choice certainty (only a medical study, possibly also another socially oriented study, possibly also another natural sciences study, possibly also a completely different study and possibly also a non-university study) served as outcome variables. The data analyses performed in this thesis were based on five samples, two of medical applicants (who had not yet participated in the selection test) and three of medical students in their pre-clinical study years.

Each study conducted in this thesis had a different focus. The study in Chapter two was aimed at identifying subgroups of applicants by using a person-centered approach (LCA: latent class analysis). This means that the identification was based on the applicants' scores on personal characteristics and interest variables. In a next step, the identified subgroups were related to the applicants' study choice certainty and their aspired work environment. Knowing more about subgroups has been argued to be valuable in advising applicants about their study decision. For example, applicants who are mainly interested in helping others might profit from information other than that useful for scientifically interested candidates. Chapter three dealt with the medical applicants' study expectations. Here a sample of medical applicants was compared to a sample of medical students to learn more about study expectations in relation to actual study experiences. Having accurate expectations about the medical curriculum is assumed to influence students' study performance. For example, inaccurate expectations may result in disappointment, while an accumulation of disappointments may lead to negative attitudes toward the medical program (Tiberius et al., 1989). The focus of Chapter four was to investigate the influence of associations between personality characteristics and self-efficacy on top of the impact of the students' grade point average at high school. In this study, the influence of self-efficacy, which was added to the personality characteristics, was of particular interest. The inclusion of self-efficacy rendered it possible to take our students' belief in their own abilities into account. Chapter five dealt with examining the influence of associations between the students' vocational interests and prestige on their aspired work environments. This time special attention was paid to prestige, which was assumed to influence medical students' work aspirations.

The theoretical background of this thesis was based on the vocational choice theory of Holland (1959). One of its major assumptions, namely that individuals tend to search for environments which satisfy their major orientations, was especially useful for the exploration of the students' aspired work environments. In addition, the results of this thesis served in validating the suggestions about broadening Holland's vocational choice theory by adding prestige to the vocational interest scales. Another suggestion discussed in further detail was to include social activity and self-efficacy into Holland's theory of vocational choices.

The structure of this final Chapter is as follows. First, a summary is presented of the results of each study. Next, the findings are discussed and a number of general conclusions are drawn. After that, we offer suggestions for further research and discuss some practical implications.

Summary of the Main Findings

In Chapter two, a person-centered approach was used for the investigation of the pool of medical applicants ($N = 5607$) with regard to their vocational interests, their interest in prestigious professions and their scores on self-discipline, self-efficacy and social activity. We found that a four cluster solution containing a more socially-oriented group, a more investigative-oriented group, a more prestige-oriented group and a more ambitious group, best fitted the data. In a next step, these subgroups were related to study choice certainty (only a medical study, possibly also another socially-oriented study, possibly also another natural sciences study, possibly also a completely different study and possibly also a non-university study) and the applicants' aspired work environment (family doctor, specialist in a private practice, specialist in a hospital, scientific researcher, dentist, plus an option 'not yet decided'). With regard to study choice certainty, the more investigative-oriented group was the least convinced about opting for the medical studies. Only 31% of this group stated that the medical studies were the only option for them (compared to 49% of the total sample). Furthermore, 24% of the prestige cluster indicated that a completely different study would be an option as well (compared to 14% of the total sample). With respect to the aspired work environment, 21% of the applicants from the more investigative-oriented group were still undecided on this issue (compared to 14% of the total sample). Moreover, 31% of the more prestige-oriented group aspired to work as a specialist in a private practice

(compared to 24% of the total sample). Thus, the application of LCA resulted in the identification of four groups of medical applicants, which differed in terms of their study choice certainty and their aspired work environment. The heterogeneity of this sample, however, could have been expected, keeping in mind that the medical program provides a broad educational spectrum with various job options (Stratton, Witzke, Elam, & Cheever, 2005).

In Chapter three, a sample of medical applicants was matched with a sample of medical students ($N = 334$) based on gender, academic performance and study places to examine the accuracy of the first group's study expectations. Both the medical applicants and the medical students were asked to judge identical statements about the medical curriculum. The statements focused on the practical focus of the studies, workload, learning strategies and study demands. The medical applicants were asked to rate the statements on the basis of their study expectations, while the students had to rate them on the basis of their actual study experiences. The degree of accuracy of the applicants' study expectations was indicated by comparing this group's responses to those of the students. The four main areas of disparity were an underestimation of the standard study time period (applicants scored lower than students), an underestimation of the demand for rote learning (applicants scored lower than students), an underestimation of the available time to understand study contents (applicants scored lower than students) and an overestimation of the practical focus of the studies (applicants scored higher than students). These disparities could lead to disappointments during the curriculum, most likely with respect to the practical focus of the studies. Here, the applicants seemed to be too optimistic.

In Chapter four, hierarchical logistic regression analyses were used to investigate the joint impact of personality characteristics and self-efficacy in addition to that of pre-university performance (GPA) on students' pre-clinical academic achievement. After excluding 572 students because of unavailable grade point average scores, the sample contained 291 students. The results showed a significant positive effect of self-discipline and self-efficacy, whereas social activity was significantly negatively related to students' pre-clinical academic performance. The effect that students who are better organized and work in a more structured way, are more likely to succeed, could have been expected. Also the positive effect of self-efficacy, which measured students' belief in their academic skills, was not surprising. The results further indicated that less outgoing students performed

better. In our study, students' GPA was entered as control variable to examine the additional contribution of non-cognitive factors apart from students' pre-clinical academic achievement. These results confirmed the earlier findings that non-cognitive factors indeed explain an additional amount of variance on top of cognitive factors (Robbins et al., 2004; Trapmann et al., 2007).

In Chapter five, multinomial regression analyses were applied to examine the relative impact of vocational interests and prestige on students' aspired work environment. The sample consisted of 788 students. As operationalized in the study, prestige measured students' interest in status and socio-economic aspects. Among physicians the most common vocational interests were investigative, social and artistic interests (Antony, 1998; Borges, Savickas, & Jones, 2004). The results of our study revealed, as expected, that our medical students scored higher on social, artistic and investigative interests than on realistic, conventional and enterprising interests. They also scored higher on prestige, which turned out to be one of the most distinct scales in our sample of medical students. Moreover, the impact of vocational interests and prestige varied as a function of the aspired work environment (specialist in a private practice, specialist in a hospital, scientific researcher and dentist) with family doctors as the reference group. This means that students who were particularly interested in prestige more frequently aspired to work as a specialist in a private practice than the reference group. Investigative students particularly preferred to work as a scientific researcher, while students with realistic interests particularly aspired to become a dentist or a specialist in a hospital (compared to the reference group).

General Conclusions and Discussion

This section discusses the thesis' main findings. First, the identification of four interpretable subgroups within the group of medical applicants (social-, investigative, ambitious- and prestige-oriented) seems to explain in more detail the major reasons for deciding to choose the study of medicine. In literature, the reasons most often mentioned generally refer to the need to help other people, a high interest in science and the attraction of the perceived status associated with the profession (Antony, 1998; Farrokhi-Khajeh-Pasha, Nedjat, Mohammadi, Rad, & Majdzadeh, 2014; Marley & Carman, 1999; McHugh, Corrigan, Sheikh, Lehane, Broe, & Hill, 2011).

The results of our study are based on the application of a person-centered approach which enabled the identification of subgroups within a sample (Pastor, Barron, Miller, & Davis, 2007). This approach focused on the differences among individuals, rather than on the relationships between variables, as is the case in a variable-centered approach. The use of LCA led to the identification of four interpretable subgroups whose members shared similar response patterns. In our study, we added personal characteristics (self-discipline, self-efficacy, and social activity) to the vocational interests (RIASEC scales and prestige).

Although vocational interests and personality characteristics are related concepts, they provide supplemental information (Armstrong & Anthoney, 2009; Costa, McCrae, & Holland, 1984; Furnham, 2001). According to Hogan and Blake (1999): “*Vocational interest measures tell us how much a person will like an occupation, personality measures tell us about the social skills and drives necessary to succeed once in the occupation*” (p. 54). Our findings showed that personal characteristics were related to the most distinctive scales in addition to the vocational interest scales. For example, self-efficacy was a dominant scale in all subgroups. When applying Holland’s vocational choice theory – which describes work environments in terms of people working in specific work settings – to our results, it could be concluded that medical applicants should be well advised to believe in their own abilities.

Another personal characteristic with comparatively high scores in the characterization of the subgroups was social activity. Social activity was combined with social interests and self-efficacy in the more socially-oriented and the more ambitious subgroups, whereas this was not the case in the more prestige- and more investigative-oriented subgroups. On average approximately 14% of the medical applicants indicated that a completely different study choice would possibly be an option for them as well. Among the subgroups, relatively large differences were shown for this aspect. Here, around one fifth of the more prestige-oriented and more investigative-oriented subgroups could imagine studying something completely different, whereas this was only the case for around 8% of the more socially-oriented and the more ambitious subgroups. As mentioned above, one of the main differences between the more prestige-oriented and the more investigative-oriented subgroups and the other subgroups was that social activity was not a dominant scale in the first two subgroups.

These findings suggest that personal characteristics have an influence on medical applicants' career conceptions such as their study choice certainty. Considering our results, we agree on a statement of McLarnon et al. (2015) that "*with improved classification, researchers and practitioners will be able to better, and more accurately, differentiate among individuals, assist with vocational counseling initiatives, and investigative research questions surroundings vocational interest*" (p. 15). Based on our findings, the inclusion of personal characteristics into the models better enabled us, in our opinion, to identify subgroups.

Second, we found another aspect that deserves more attention in the evaluation of the impact of personality characteristics (self-discipline, social activity and emotional stability) on students' pre-clinical academic achievement, namely self-efficacy. Also self-efficacy made an independent contribution to the medical students' pre-clinical academic achievements, even when the students' high school grades were also included in the model. This finding affirms the impact of personal characteristics for study success in the first two years. Medical students with higher scores on self-discipline (e.g., I finish one task before starting the next one), self-efficacy (e.g., I also tackle difficult tasks with confidence; I can handle pressure to perform) and lower scores on social activity (e.g., I like to meet new people) performed better.

However, we argued that the impact of personal characteristics may change in higher study years because of the different study requirements. For example, a personality characteristic whose impact is likely to change during the medical studies is extraversion (see Lievens et al., 2009). However, the way in which this scale is operationalized may have an influence on its impact on students' performance. In our study, we restricted extraversion to the aspect of social activity, ignoring its other facets, such as warmth, gregariousness, assertiveness, excitement seeking and positive emotions. Referring to our findings, medical students with higher scores on social activity performed less good in their pre-clinical years, in which huge study workloads have to be handled (e.g., memorizing facts). Possible explanations are that these students spent less time studying than socially less active students or that they had more difficulties in concentrating on the learning material. In the clinical study years medical students are required to interact with colleagues and patients on a more frequent basis. Therefore, social activity, which was in our study

negatively related with students' pre-clinical achievement, may have a positive influence on students' performance in the higher study years (see Lievens et al., 2009).

As regards self-efficacy, its positive impact on students' achievement in the first study years is assumed to remain so in the clinical part of the medical curriculum. This assumption is based on two lines of reasoning. First, self-efficacy is assumed to measure a general skill that is independent of a specific situation. According to Bandura (1977), for example, positive experiences gained in one situation (e.g., during high school) increase the self-efficacy beliefs of individuals and make them more confident to be successful in other situations as well. Bandura (1982) has argued that "*perceived self-efficacy is concerned with judgements of how well one can execute courses of action required to deal with prospective situation*" (p. 122). Second, specifically one's level of self-efficacy can be changed through intervention programs (Bresó, Schaufeli, & Salanova, 2011; Robbins et al., 2004). For example, Bresó et al. (2011) demonstrated that cognitive behavioral interventions successfully reduced students' feelings of incompetence, and helped them in developing skills to better cope with stress. In general, the value of self-efficacy lies in its influence on individuals' behavior. Individuals who are more self-confident will put more effort in tasks and proceed even in the event of difficulties (Bandura, 1977; Chemers, Hu, & Garcia, 2001; Tipton & Worthington, 1984).

Third, this thesis further investigated the associations between vocational interests and prestige and the aspired work environment of the medical students. Our results showed that the impact of vocational interests and prestige varied as a function of the students' aspired work environment (see main results). The operationalization of the vocational interests was based on the well investigated model of Holland (1996, 1997). Prestige was added to the vocational interests to measure the students' interest in prestigious work environments, because this variable is often mentioned as a motivational driver for choosing a medical career (Creed et al., 2010; Duffy et al., 2009; Rosoff & Leone, 1991). Although prestige is a rather broad construct (Gottfredson, 1996; Sodano & Tracey, 2008; Tracey & Rounds, 1996), we particularly concentrated on students' interest in the status of the work environment (e.g., appreciation; a leadership role as regards other employees/staff members) and its socio-economic aspects (e.g., earning a lot of money; attaining a high position in society). Therefore, our interpretation of prestige specifically focused on how much an individual likes or dislikes the aspects of the occupation, while vocational interests

typically concerned the activities that need to be performed in the job. As operationalized in our study, prestige could be viewed as measuring the aspects of an individual's work values. In his theory of vocational choice, Holland (1959) explicitly stated that “*“interest inventories” are conceived here as personality inventories which reveal information such as the person's values, attitudes, needs, self-concept, preferred activities, and sources of threat and dissatisfaction*” (p. 36). So individuals with adequate self-knowledge are considered to make better vocational choices on a more frequent basis than people with inadequate self-knowledge (Holland, 1959). More insight into oneself will enable an individual to search for a work environment that best suits his/her needs. However, although Holland (1959) defined interest inventories as personality inventories, his theory mainly focused on the RIASEC interest scales. Our study revealed that prestige supplements Holland's vocational interests by providing information about an individual's work values (at least for the medical sample). Furthermore, prestige was also shown to have a meaningful impact on students' work environments in the case of the option becoming a specialist in a private practice. Based on these results, we recommend the integration of prestige into the interest assessments. Especially within the medical context, which is known to be highly prestigious, measuring prestige in addition to students' vocational interests seems to be useful in gaining more insight into students' vocational choices.

The main conclusions as discussed above have some further implications for both the vocational choice theory of Holland in general and for future research in particular. The next section will address this issue.

Suggestions for Further Research and Implications for Theory Development

Our results were based on several cross-sectional studies that enabled us – first – to describe our sample of medical applicants and – second – to investigate the associations between non-cognitive factors together with students' pre-clinical academic achievement (for personality characteristics and self-efficacy) and their aspired work environment (for interest variables and prestige). The theory of vocational choices from Holland (1959) formed the theoretical background of this thesis. This section presents some suggestions for refining his theory.

To begin with, due to the exploratory nature of the studies presented in Chapter two and three, a replication of the study results would be required. In Chapter two, we used latent class analysis for the identification of subgroups within the sample of medical applicants. This type of approach provides more objective criteria for the selection of a model than the more traditional methods, such as cluster analysis (Magidson & Vermunt, 2002; Marsh, Lüdtke, Trautwein, & Morin, 2009). However, as yet no real consensus has been reached about the best selection criteria (Nylund, Asparouhov, & Muthen, 2007). Often, the selected solution also depends on the model's parsimony and on the judgement of the researcher concerning the most useful approach in view of the scientific goal (Rindskopf, 2003). Although the identification of the four subgroups in our sample was well interpretable, we recommend replicating our findings in other samples of medical applicants. Furthermore, in our opinion the application of latent class analyses for a sample of medical students would also be a suitable option. In this context, feasible research questions would be whether similar subgroups could be distinguished among medical students and if so, whether the sizes of these subgroups are comparable to those of the identified subgroups of medical applicants (with 44% belonging to the more socially-oriented subgroup, 20% to the more prestige-oriented subgroup, 18% to the more investigative-oriented subgroup and 17% to the more ambitious-oriented subgroup). In this way, an insight could be gained into the question whether there are certain medical subgroups which are more successful in passing the selective permission test than other subgroups.

To continue, the study results of Chapter three, based on a newly developed questionnaire to examine the medical applicants' study expectations should be interpreted with caution. To create this questionnaire, we conducted a survey among students ($n = 496$), lecturers ($n = 94$) and physicians ($n = 57$) to obtain insight information on the most common misconceptions about the medical studies. Experts in the field then evaluated the comprehensibility of the items. Follow-up studies are required which are specifically focused on the development of reliable scales. In a next step, these scales should then be cross-validated while verifying if differences also occur in external criteria. For example, do medical students who use more appropriate learning strategies also receive better grades?

Nevertheless, the findings of our study have mapped out some relevant study content items (e.g., practical focus of the studies, learning strategies) for future scale construction,

as well as areas where the expectations of medical applicants deviate from the actual experiences of medical students. We recommend revising the current version of the questionnaire by adding items that examine the study expectations of medical applicants in more depth. In addition, an aspect that might be of importance as well and which was not yet included in the current version of the questionnaire, are applicants' expectations as regards the natural sciences, which form an integral part of the first two years of medical education. We would assume that there are differences among the medical subgroups with regard to the expectations about the degree of focus on natural sciences in the medical studies. The more investigative-oriented subgroup may expect a larger emphasis here than the more socially-oriented subgroup.

Another suggestion concerns the investigation of the variable medical students' work aspirations (Chapter five). As pointed out in the thesis, after having finished the medical studies, students have to choose between taking up a specialty or opting for a non-clinical program. In our study, we asked students about their aspired work environment. However, their intentions in this respect might not have been congruent with the actual choice they ultimately made. Therefore, in order to obtain knowledge on the stability of their choice of work environment, research should be conducted into the degree of job change among the population of graduated medical students, and which non-cognitive factors are related to this decision.

More research is also needed to test Holland's theory of vocational choice. Applied to our findings, the hypotheses of congruence imply, for example, that students who are particularly interested in a prestigious work environment perform better, are more satisfied, and less often change their jobs, if they work as a specialist in a private practice. The same seems to be true for students who are specifically interested in investigative activities; for them a career in academia would be the best suitable option. To test the hypotheses of congruence within the medical field, we suggest research that compares physicians classified as working in congruent work environments to physicians working in incongruent work environments on the basis of a set of outcome criteria (e.g., performance, satisfaction). Special attention should then be paid to the physicians who have chosen a clinical (or non-clinical) field that does not fit their personality. For example, do these physicians try to adjust to the 'incongruent' work setting, do they choose a different clinical (or non-clinical) work setting or do they switch to a completely different work setting

altogether? Based on our findings, we further suggest supplementing the vocational interests by adding personal characteristics to investigate the behavior of the individuals in the work settings. We recommend this because in our view a person's behavior within a certain work environment as well as his/her interaction with others is influenced by his/her personality (see Furnham, 2001). Referring to our findings, a person with a need to help others (high social interest scores) and who has high scores on the social activity scale, presumably feels more comfortable working as a family doctor than as a surgeon. A surgeon also helps others, but social interaction with patients is a less common part of his/her daily tasks. More generally speaking, personality has an influence on the way in which a person communicates with others.

In our view, the ability to interact effectively with others is another very important aspect in most work environments within the medical field. Therefore, we believe that the inclusion of the concept of perceived social self-efficacy (e.g., Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, & Rogers, 1982; Smith & Betz, 2000) would provide further insights into the work performance and work satisfaction of physicians. Perceived social self-efficacy tells researchers and practitioners something about the extent to which people consider themselves capable of successfully interacting with others. More research is needed, however, to investigate whether in the medical work field physicians with high social self-efficacy scores change their jobs less often and are more satisfied with their daily tasks. We assume this to be the case, because physicians with a strong belief in their social abilities are more capable of getting along with others. In sum, a match between personality and work environment as well as the perceived self-efficacy are relevant predictors of work success. To conclude, what our data have at least shown is that self-efficacy is an important factor in medical students' academic achievement in the pre-clinical study years. Further studies are necessary to examine the impact of social self-efficacy and other non-cognitive factors (e.g., communication skills) on students' achievement in the clinical study years. In this context, also the importance of structured interviews would be an interesting research topic because multiple mini interviews (MMI) for example are supposed to reflect good measurements of non-academic qualities (Eva et al., 2009). As mentioned in the introduction, the impact of predicting factors on selected outcome measurements (e.g., academic and clinic performance) should be established first before integrating these factors in admission procedures. Based on our results we have

concluded that a self-administrated assessment, measuring applicants' non-cognitive factors, might lead to a better self-selection during the admission procedure. This conclusion was based on the argumentation that providing objective and reliable information to the applicants will enable them to make a well-informed study decision before taking part in the selective performance test. Also other researchers have discussed the influence of self-selection within an admission procedure for medical studies (Benbassat & Bauml, 2007; O'Neill, Hartvigsen, Wallstedt, Korsholm, & Eika, 2011; Schripsema, van Trigt, Borleffs, & Cohen-Schotanus, 2014; Urlings-Strop et al., 2009). However, further research is still necessary to validate these assumptions. Furthermore, universities have implemented different methods for selecting the most promising medical applicants with regard to their academic and clinical performance abilities. So far, there is relatively little evidence on the admission-performance implications of these methods. For example, the implications of various selection methods on the composition of the pool of medical students as well as on the success rates of these students (e.g., drop-out rates, performance measurements) still need to be addressed more comprehensively. Moreover, we agree with the statement of Searle and McHarg (2003) that *"like an evolving curriculum, processes for selecting medical students in the fairest and most valid way must be constantly evaluated"* (p. 462). In conclusion, an admission procedure should lead to the selection of applicants with the highest potential to both graduate and start working as physicians after graduation.

Implications for Practice

The findings of this thesis can be used for the development of a self-administered assessment that complements the selection process of medical applicants, which has currently been based on cognitive factors (grade point average scores and/or scores on performance tests). Following our findings, this assessment should include a tool to measure applicants' scores on non-cognitive factors (e.g., personal characteristics, vocational interests). Given this thesis' findings that personality characteristics and self-efficacy explain an additional amount of variance in students' pre-clinical academic achievements on top of their pre-university performance, such a tool would be beneficial. Furthermore, since our results have shown that students' vocational interests differed across the aspired work environments of medical students, this assessment should also include an

interest questionnaire. We believe that the implementation of the assessment early in the admission process will have positive effects, such as improved self-selection on the part of the candidates, resulting in a larger pool of well-suitable applicants who made an informed study decision (Benbassat & Baomal, 2007; Powis, 1994).

Another proposed advantage of the self-administrated assessment is that it gives medical applicants the opportunity to deal with their study decision in more depth. As explained in the previous section, the degree of congruence between people and work settings is important for being successful in terms of performance, satisfaction and career stability. Therefore, according to the vocational choice theory of Holland, medical applicants who possess more self-knowledge and acquire more information about both clinical and non-clinical work settings are more likely to make study choices which are better in line with their personality. The knowledge that students with high social scores generally aspire to become a family doctor could be a valuable piece of information for applicants who are mainly interested in helping others. And even more detailed feedback could be obtained by focusing on the medical applicant subgroups. Our findings, for example, revealed that the more investigative-oriented subgroup contained the highest rate of undecided applicants with regard to the aspired work environment. This subgroup, therefore, may especially profit from additional information on the wide variety of job options for physicians (Borges & Savickas, 2014; Duffy & Richard, 2006). To continue, the more prestige-oriented applicants may appreciate the information that students with higher scores on prestige more frequently aspire to work as a specialist in a private practice than students with lower prestige scores. Receiving this kind of feedback will enhance applicants' ability to better differentiate among the work environments of physicians.

Furthermore, our knowledge about study-relevant personal characteristics could be used to design personality profiles of successful medical students based on the personality questionnaire as constructed in this thesis. If applicants were requested to fill out the same questionnaire, a comparison could be made between the students' profiles and the applicants' profiles (Kyllonen, Walters, & Kaufman, 2005). Applicants could then receive valuable feedback about their potential strengths and weaknesses and their typical behavior in specific situations. For example, attaining considerably higher scores on study-relevant personality scales as successful students disclose a strength in applicants' work behavior, whereas considerably lower scores may indicate an alleged weakness. Based on our

findings, useful characteristics for medical applicants are, for example, abilities such as starting and finishing tasks in time as well as handling pressure. In the case of relatively low scores on these items, coping strategies should be integrated in the feedback, so that applicants are given the opportunity to address possible weaknesses before the start of the study. In any case, the assessments' feedback must be carefully formulated so that applicants do not become frustrated in case of considerably lower scores than the reference group. Therefore, every applicant should be informed about the content of the measured constructs and its associations with study success. Additionally, it is appropriate to let applicants know that their results are in comparison with a reference group and must be interpreted with caution. Nevertheless, normed information accurately discovers how typical or unusual measured characteristics are in relation to a comparison group (Meyer et al., 2001).

Similarly, medical applicants may value personal feedback about the accurateness of their study expectations. They may expect the practical focus of medicine to be larger than it actually is compared to the experiences of the medical students. This feedback, combined with the information that natural sciences form an integral part of the curriculum, especially in the pre-clinical years, is believed to be helpful. In sum, giving applicants the opportunity to challenge their study expectations early in the admission process hopefully prevents them from becoming disappointed during the actual curriculum (see Draper & Louw, 2007; Pike, 2006).

To conclude, this thesis has provided insights into the heterogeneity of the pool of medical applicants. The subgroups differed with regard to their characteristics of vocational interests, prestige and personal characteristics. This can be seen in line with the fact that medical education offers a broad education, combining natural sciences with social aspects of a physician's work. Additionally, the study expectations of medical applicants differed compared with students' actual experiences with respect to the practical focus of the study, the workload, the learning strategies and the study demands. This thesis has also contributed to the knowledge base of the impact of non-cognitive factors on medical students' early study success and their work aspirations. This was done by particularly focusing on the added value of self-efficacy and prestige, two variables that were demonstrated to be of importance for mentioned issues. As recommendation, this thesis has

proposed to broaden the medical admission process by the implementation of a self-administrated assessment for medical applicants that enables them to make a well-considered study decision. This might especially be valuable for the study course of medicine that includes a vocational choice already during the studies.